

## MEDICARE PAYMENT ADVISORY COMMISSION

## PUBLIC MEETING

Ronald Reagan Building  
International Trade Center  
Horizon Ballroom  
1300 13th Street, N.W.  
Washington, D.C.

Thursday, March 18, 2004  
10:06 a.m.

## COMMISSIONERS PRESENT:

GLENN M. HACKBARTH, Chair  
ROBERT D. REISCHAUER, Ph.D., Vice Chair  
AUTRY O.V. "PETE" DeBUSK  
NANCY-ANN DePARLE  
DAVID F. DURENBERGER  
ALLEN FEEZOR  
RALPH W. MULLER  
ALAN R. NELSON, M.D.  
JOSEPH P. NEWHOUSE, Ph.D.  
CAROL RAPHAEL  
ALICE ROSENBLATT  
JOHN W. ROWE, M.D.  
DAVID A. SMITH  
RAY A. STOWERS, D.O.  
MARY K. WAKEFIELD, Ph.D.  
NICHOLAS J. WOLTER, M.D.

**AGENDA ITEM: Information technology in healthcare: Current status and potential government roles - Chantal Worzala, Karen Milgate**

DR. WORZALA: Good afternoon. We are here to share with you what we've learned about information technology and health care. Since this is rather a new topic for the Commission we do see this primarily as an informational piece. We've been gathering information and talking with people in the field since the summer. We also had a contractor do both a lit review and a series of interviews with hospitals about their investments in IT. If you want a copy of either of those contractor reports just let us know. They weren't in your briefing materials.

IT in health care has been receiving considerable attention recently, and especially clinical IT that has a potential to improve quality. Policy questions that we thought were relevant for MedPAC particularly at the beginning are what kinds of investments have hospitals and physicians made in IT and in what kind of IT? What are the barriers and drivers for further diffusion of IT systems? And what steps might be taken to further encourage diffusion of IT?

Just like this table, IT is multifaceted and complex. The applications are evolving day to day and they're very specific to installation in a specific organization. For example, an order entry system which allows a physician or a nurse to use electronic communication to ask for an ancillary service may be solely for medications or prescriptions, or it could also include lab tests, radiology, consults, referrals, other kinds of orders.

Similarly, an electronic health record can be essentially a digital version of a medical chart or it could be a tool that allows real-time access to patient information that might provide clinical decision support services like a prescribing alert, or it could also incorporate order entry functions. So when you talk about IT it's important to know exactly what you're talking about because the installation and the outcome may vary depending on what specifically is being done.

So to help structure our discussion of IT we created a typology that included administrative IT systems such as billing and payroll, clinical systems, things like CPOE, PACS and/or digital imaging, and the electronic health record. There all also infrastructure that must be put into place to support IT and that includes the hardware, the networks, and the security system that supports other

functions.

In your briefing papers we did go through these technologies in considerable detail and looked at both the hospital and physician settings, but in the interest of time we won't do that here. We just want to focus on some general conclusions from our review.

The first of those is that the administrative systems are more widely diffused than any of the others. However, most of the policy attention has really been focused on clinical systems, and particularly CPOE and electronic health records. It's important when you talk about IT to remember the infrastructure costs which are fairly higher for many of the clinical systems. For example, if you decide to introduce CPOE into your hospital, do you also need to make that a wireless system and what would that mean? Then if you start holding or transferring clinical information electronically via your electronic health record what kind of security protocols do you need to put in place to protect that information?

Finally, an investment in IT is not just purchasing the technology itself. There are many other factors. There are maintenance and support costs. There's initial and ongoing training. There are changes to work processes for almost everyone in the organization. And considerable effort needs to be put in to gain the acceptance of providers and to promote widespread usage of the technology.

So that was talking about IT within an organization. But in addition to that, many people have talked about the benefits that can be gained from facilitating communication among providers. The term interoperability is often used to describe the ability to transfer electronic clinical data from one provider to another. There are very few providers now who share information electronically. Instead much of this is done through the mail, faxes, phones, and of course, patients carrying things back and forth from one provider to another.

However, faster and electronic communication among providers does have the potential to enhance coordination of care, lead to better decisionmaking based on greater information, and potentially result in savings on repeat tests and procedures. Achieving this level of communication requires development of standards for both the content and the messaging of information. This really forms the base of what people refer to as an information infrastructure.

Currently, there is very little of this going on in the United States. There are several cities that have linked the emergency departments of local hospitals, and a couple of places are developing data repositories that link local providers, but they are the exception rather than the

rule. As Karen will discuss, building an information infrastructure is something that is a priority of the Secretary.

Given the recent attention that has been given to clinical IT I thought we'd spend a bit of time on that and talk about the diffusion estimates. A very large caveat here. There really are no nationally representative surveys of IT use among hospitals and physicians. One exception would be the community tracking survey and the physician surveys that have been done by the Center for Studying Health System Change, but that's a little bit older data. The surveys that do exist generally suffer from selection bias. For example, many of these surveys are conducted on the Internet so you would think that they probably are biased towards those who are more advanced users of IT than the average.

Nonetheless, current levels of diffusion are estimated to be low for CPOE. There seems to be a consensus, 5 or 6 percent of hospitals having operational systems in place now. A lot of people think this may be a conservative estimate, depending on the definition of what you mean by an operational system in place now. Nevertheless, those are the numbers that are out there.

For electronic health records, surveys suggest that 20 to 25 percent of physicians have them, and EHRs do seem to have diffused more widely among physicians than among hospitals. This may be because physicians do have a greater need to follow their patients over time and across settings than do hospitals.

For both hospitals and physicians, the size of the institution does seem to be correlated with the use of IT, so larger hospitals and larger physician groups are more likely to be advanced users of IT. In addition, closed systems such as the VA or a staff model HMO is also more likely to have IT systems implemented.

Despite the low current diffusion, in the past few months surveys have suggested a remarkable increase in providers' interest in IT. Hospitals have been increasing their capital budgets and IT has really become a priority within the capital spending of many hospitals. Physicians also expressing an increased interest in having electronic health records. This may be fueled in part by some alternative ways to go about it, so leasing options and subscription options whereby an IT company actually maintains the software and stores the data and the physician would pay a monthly fee to use it.

So when you think about investing in IT one of the first questions is, will pay all off? Our analysis of what's out there about the financial return to investment in IT is that the administrative systems generally have paid

off. Financial returns for the clinical applications however are really quite uncertain. This is partly because it's hard to quantify the cost and the benefits for many of these systems because it involves so much more than just the technology.

So if you take the example of a physician investing in electronic health record, they do have the cost of the hardware and the software and training, and then they have to re-work the processes in their office. But there are some physicians saying that an electronic health record actually increases their workload because they need to enter the information themselves. They also feel that it might interfere with the personal interaction between the physician and the patient. So those costs can be hard to measure.

Then the benefits could be increased documentation of care, fewer rejected claims, increased efficiency of keeping medical record which could lead to lower admin costs. You may be able to take a room devoted to paper record storage and turn it into an exam room, leading to increased revenues. And you may be able to save on your malpractice costs as you have better care documentation. And of course, you may have improved quality of care. So quantifying those things, measuring them, making an ROI is fairly difficult.

In the hospitals that were interviewed as part of this project, they really did not assess the return on investment, particularly when they were talking about CPOE or EHRs. They were really focused on the quality and safety improvement as the main justification for investment.

There are, however, some clinical technologies such as PACS, which is a radiology system for storing images on the computer rather than on film, there is a positive return generally and it has been realized among some hospitals, particularly the large hospitals and the large radiology practices that do a lot of imaging. This positive return along with the more narrow focus of the application and the clear benefit to the physicians do seem to be why PACS is diffusing more rapidly than some of the other clinical IT systems.

So when we think about the financial return to the investment there is one other issue which is that the financial return may not accrue to the organization that makes the investment. So if a hospital puts in a CPOE system and prevents an adverse drug event that might have required an additional hospitalization, it's not the hospital that will see the financial gain. It's the insurer that sees the financial gain. I think we've talked about that previously. And of course, the patient benefits in that example from the improved care.

So if the financial return is uncertain, what is driving investment in IT, at least to the extent that see it? It does seem like the promise of quality and safety gains have been the major reason to invest in clinical IT, and particularly CPOE and EHRs. This has been bolstered by the attention to IT systems from the Leapfrog Group, IOM and others. In addition, the development of data standards and regulations have been cited as prompting investments. So for example, many hospitals are currently enhancing their IT security systems to comply with HIPAA regulations.

Similarly, in February the FDA put out a final rule requiring drug manufacturers to label their products with bar codes. A lot of people think that this will encourage hospital investment in bar coding technology to read those bar codes. A cautionary note there, people feel that widespread adoption by hospitals will depend on the extent to which bar coding happens at the dose level as opposed to being on packaging of a larger unit of drugs.

So other drivers of IT investment include continuing evolution of the technology leading to a better product at a lower price, and competition among providers with the desire to be seen as cutting edge and technologically advanced.

Those are some of the drivers. What are the barriers? Cost is certainly considered a major barrier to investment in IT. These are expensive systems. But we found that this is by no means the only barrier to investment. In our interviews with hospitals and in the trade press the nascent technology market was seen as a significant barriers. Products are evolving and vendors may not be able to deliver the level of support that is needed. In addition, the market is perceived to be unstable with individual products being obsolete or no longer supported and vendors buying each other up.

In addition, providers can't be certain that an investment will actually become operational. I think you've all heard about some of the high-profile failures that have occurred.

Implementing an IT application is difficult and risky because it is a very complex system and you need to integrate the new system into your existing system, which isn't always easy. And you're going to be putting in significant work process changes to use this new IT. And if you don't, it seems like the benefits of the IT don't actually come about.

Finally, a lot of people talk about the uncertainty of acceptance by the users of IT, by physicians, nurses, and other hospital staff. And finally, some have noted the lack of specific reimbursement for IT as a barrier to adoption. Just pause again to note that the strength of

the barriers does seem to change by setting. Larger hospitals and systems do seem to be better able to overcome them.

I'm going to turn it over to Karen now.

MS. MILGATE: In this part of the presentation we'll discuss current public and private sector efforts to encourage further diffusion, a little bit about whether a need exists for further action for speeding up the adoption of technology, and what other public and private efforts might be possible to make this happen.

Current public and private efforts are many. I would just note that during the process of doing this analysis, Chantal and I felt like we were inundated daily with new efforts that were out there, both privately and publicly, for ways to try to further encourage diffusion of health care IT.

Basically the efforts were at two levels. One was the individual provider level; how can we make it more possible for individual providers to adopt health IT? And the other level was really more of the interoperability level; the word that we learned how to pronounce that at first we did not know how to pronounce. That is just the basic concept of information flowing across providers. So I think that is an important distinction.

The first bullet on this slide is about standards adoption. What I've done here really is give an example under each of these areas of a public effort and a private effort. Interestingly, on this one there's a huge overlap between the efforts, which was by design, at least from the public sector folks.

Under standards adoption, the purpose here is more the information flow across providers. Here the concept that has made it easier for me to understand what this is is a railroad car where you have standards to determine what the tracks are like and what the cars are made of, and you also need some standards to determine how you're going to talk about what's in those boxcars. So they do both. They do definitions of the lab values that will go in and out of the lab, but also the type of messaging that will occur within the information system itself.

HHS has put quite a bit of effort to developing the National Health Information Infrastructure Initiative. A couple of examples of what they've done there is working through their consolidated health informatics program, tried to work on adoption of specific standards for federal government health programs. So for example, they've adopted standards for labs, prescription drugs, imaging, and a couple of others for use for all federal government agencies. So you have the VA, the DOD, for example using the same kind of messaging standards.

They've also put some efforts forth to try to define some functionalities for the electronic health record. So when institutions are putting in place electronic health records they're really talking about the same things and it's easier for them to define what types of functionalities they want within their own organization.

Private sector efforts, and one of the larger groups that's being used both by the public and the private sector is Health Level 7 group. I don't have a huge familiarity with them, but their basic purpose is to develop standards. So some of these programs have been given to Health Level 7 standards. For example, right now they have out for comment the functions that they've defined through a consensus process for electronic health record. The standards that were adopted by the Secretary for labs and prescriptions were adopted by private sector organizations. So you have really very much of a public-private effort there.

The other thing that both public and private sector organizations have done is try to fund research on the value of health IT. AHRQ has done a lot of research on this, but they put out an RFP recently to spend \$40 million in 2004 to try to get a better handle on the value, both in terms of quality payoff as well as cost payoff, or savings payoff for putting in place health information technology.

Another example is the Center for Information Technology Leadership. I don't know if the actual report is out now or not, but they are working on a report showing significant savings if health information technology were fully implemented and used throughout the nation.

Other efforts include just the basic encouraging the use of health information technology. The Medicare Modernization Act, for example, had some provisions to encourage the use of e-prescribing. Again, it was to try to adopt standards and then require those who do electronic prescribing to use the standards. They also include some matching grants for physicians to actually put in place software or hardware, handheld devices to electronically prescribe.

The MMA also established a commission on systemic interoperability to try to strategize how to achieve that, prioritize some of the steps to take to get there. Then also within the physician pay-for-performance demo that was included in the Medicare Modernization Act they included the use of health IT as one of the measures of quality that physicians could use to actually qualify for the bonuses that are a part of that demonstration project.

In the private sector, Chantal talked to you before about the Leapfrog group. Clearly they have had a fairly significant impact on the awareness of CPOE. Some

recent research shows it hasn't necessarily paid off in terms of actual implementation as much as they would like, but they certainly have raised the awareness of benefits of CPOE. Then the types of quality incentives that we talked about in our June report last year, there are certainly some private sector plans and purchasers putting in place incentives for use of IT.

The American Academy of Family Physicians had an interesting model where they have worked with some vendors to try to get less expensive deals, so to speak. I don't know if that's the best way to talk about it, but for their members for those smaller practices that are out there and that might want to adopt electronic health records. As Chantal mentioned, there are some regional initiatives where you have providers in actual specific communities getting together and putting some monies together to create secure platforms, to share information.

There also some efforts to mandate various health IT tools. The FDA bar code rule that Chantal alluded to is one of those. It doesn't actually mandate that hospitals use them, but by mandating that pharmaceutical companies put bar codes on their products, it makes it more likely that hospitals might use them. There are some payers that are also requiring electronic billing, so that pushes the use of health IT as well.

So to the question of whether there is a need for further action, one of the questions is whether IT does actually improve quality and safety. It seems odd to ask that question because it really does make intuitive sense that clearly it would. Health care rests on having the right information at the right time for the right patient. Computers can sometimes make much more complicated calculations than the human brain, such as looking at drug interactions and applying specific protocols to certain specific people. It also makes it easier for information to move across settings much more than a paper-based system would.

There are some studies that show the potential for health information technology, particularly computerized physician order entry and bar coding, to reduce medication errors. In some cases though, some of the literature does show that even when implemented, sometimes it's not used. Now that may have less to do with the actual technology, as to how it was implemented, how much commitment the organization had to it, but I think it shows the potential for failure if it's not done right.

The other issue that we found in our analysis of the literature on whether IT actually improved quality and safety was how generalizable some of those studies were. The best studies were really done in a few institutions that

had shown strong commitment and leadership to putting these systems in place. So one of the questions that some have raised, actually including AHRQ by doing more research in this area, is how is it possible to gather more data on how IT actually does improve quality and safety.

While many are concerned that the current pace of diffusion is too slow, surveys do indicate, as the Chantal noted, a growing interest in the adoption of health IT. There's a tremendous increase, at least voiced in one survey, on more capital investment and much of the commitment in those investments seemed to be on putting in place health information technology.

In addition, because of some of the cautions we heard about the current level -- how good the product is currently, there were some that wondered if the current pace may be necessary to make sure that in the long run that health IT was put in place in an effective manner. Implementing health care IT in both hospitals and physician practices, we heard over and over again about how complex it was and how important it was to have strong commitment because of the long-term investment of time and resources it took to put these things in place appropriately. There may need to be time to build on lessons learned, both in terms of developing the appropriate products as well as learning from best practices of how to best implement these systems.

So what type of action could strengthen the drivers? The drivers that we heard about primarily were external and internal expectations regarding quality and safety. So there's a variety of different ways those drivers could be reinforced. One is something we've talked about, incentives to improve quality. We heard that even an indirect approach where you would reward those who actually put in place better practice guidelines could encourage providers to put these types of systems in place. It wouldn't necessarily one-for-one pay for the investment, but if there was a higher expectation that this would be the output of the system there would be more encouragement to actually put these systems in place.

Another way to do it might be through public reporting. Again, an incentive to improve quality that might put more emphasis on the need for putting in place these types of systems if they do improve quality. The other, which I believe is happening to some extent but which could be enhanced is research to show the value, both in terms of quality and cost savings.

What could lower the barriers? Clearly, as Chantal talked about, there are several different types of barriers. It is somewhat difficult to consider how one of the main barriers, the complexity of implementation, could actually be lowered through explicit public or private

action, but perhaps there are ways to document some of the best practices and the research, the implementation issues so we could get a better handle on how to actually implement IT and it would make it easier for systems to put it in place.

There's a possibility of, in a variety of different ways, infusing more dollars into the system. But what would be important here is to recognize that not all providers need these dollars as much as others, so it would have to be targeted. Those hospitals, for example, that are larger or in systems where there's more ability to share resources may not need the dollars as much as some others.

One concern here is whether it might be important to have more experience, again, with the products themselves and how to put them in place before you would infuse too many dollars. Clearly, the efforts to adopt standards will increase the ability for information to flow between providers and potentially increase confidence in the individual provider institution that the system they buy today will be useful for tomorrow, so there won't need to be a new infusion of investment because standards might change.

So these are some efforts that are already underway in some public or private initiative but could be expanded further. These are not as well-developed as the ones I mentioned at first. First, payment policy could be used to encourage further diffusion. Really there's two ways this could be used. One I mentioned in terms of incentives for quality. To the extent the output of quality is valued, and one way to get there is through better use of IT, that might be an incentive for further diffusion. In addition, some have talked about using IT, and I've given some examples, of one measure of whether someone is doing a quality job or not.

Others have suggested it might be useful to create a loan fund. One proposal is for matching grants with states and there would be some regional loan funds, and those regional loan funds would then decide at their own level, their regional level, who would get loans for what. Also some have suggested grants, and clearly the MMA put out some level of grants to physicians to do e-prescribing.

One other way to do it would be to mandate use of IT. Basically any purchaser could put this in place. The COPs, for example, could be used to require CPOE. Or it might be possible for conditions of participation to require certain functions be met, such as we want physicians to use clinical practice guidelines. Again, that could be an indirect incentive to put in place health IT.

One issue that's been raised by some are some of the legal barriers. The primary issue that is talked about

is somehow creating a safe harbor from anti-kickback statute. Hospitals, for example, have told us they'd like to in some way, shape or form give physicians incentives to use health IT, or even buy the hardware for them, and they have been afraid of the anti-kickback statute. I won't say that we've done a full analysis of how serious a barrier that is, but that's certainly mentioned quite often.

Another that isn't on here that I think is important the more I've heard about the community level initiatives is the possibility of sharing resources at the community level. That is a model that is currently in several different regions that I think poses a really practical and interesting model for us to think about.

This is the end of the formal presentation but we'd like your feedback on the draft chapter, the appropriate balance, and the manner in which we discuss the issues and any issues that we may have overlooked in your current draft.

MS. ROSENBLATT: I was delighted to see this chapter. I think that the draft was well done. I'd liked to ask that you think about adding something. When you talk about public and private efforts, health plans are doing stuff. Wellpoint recently, for example, committed \$30 million and received a lot of press for making computers and e-prescribing available. It's an initiative called I-Doc. If you want information on that Woody Myers, who is an ex-MedPAC commissioner could give you a lot of information about it.

We offered that choice, because I think your point is well made, that there are physicians in different states of acceptance of technology, which we recognize, so some of the small practices need the basic PC, so we made that available. Some of the larger practices already have that. They're ready to move on the e-prescribing and things like that. So that was the other part. So that we were recognizing that one size does not fit all, and I think that's a good point that you made.

MS. RAPHAEL: The chapter is titled information technology and health care, but you only talk about hospitals and physicians. I was wondering if there was a reason --

The other point I wanted to make besides that point is something else that I'm very interested in, is to what extent do we know anything about the ability of IT to improve productivity? I know you focus on quality and safety and the ROI there, but I think that's a very area for us. We have some experience with e-learning and tele-health and a few things, but I would say they're fairly stage. So I would be interested in what we could glean about that.

DR. REISCHAUER: On that point, do we have any

information in our hospital database on how far along the various hospitals are with respect to acceptance of the administrative clinical whatever, because you could relate margins to that if we had it.

DR. WORZALA: It's difficult. There's a data source out there that's at the hospital level but we're not totally sure about the validity of the data. But it's something to look at. I think we were trying with the return on investment to really get at this issue of, is this improving efficiency enough to make up the investment, and it's just really hard. People have got systematically evaluated at that level.

DR. ROWE: Two points. In your barriers to investment in IT, while it's implicit in part, I think it's worth being explicit about the limitation and the access to capital in not-for-profit hospitals. In the for-profit sector there is access to the markets, but it's more limited for the not-for-profits and that's a problem.

The second thing is, at the end of the chapter you talk about what could be done and what different proposals have been made. One of the proposals in this regard, you refer to the IOM but you don't refer to -- the academic health center report of the IOM had a recommendation that I think may have actually been discussed at the MedPAC retreat, that the proportion of the GME payments that -- IME payments, which is part of the GME payment, which was identified as beyond the empirically supported level and therefore identified as "subsidy" might potentially be used to help institutions invest in IT to better prepare them to take care of future Medicare beneficiaries. And that IOM recommendation would seem, while not popular in all quarters I'm told, might seem to be relevant to this chapter. It is in a formal IOM report so you might reference that if you think it's germane.

DR. STOWERS: I thought it was a great chapter, good summary. There was a couple little things. I think it might help all of us, having just been on a committee evaluating a moderate size hospital system and a moderate size clinic system, of how much money we're really talking about. The hospital was in the tens of millions and the clinic was in the millions, to make this step. So those that have made this step, I really pat them on the back because you're talking a lot of money here.

A second thing, just looking at who ought to get the loans and grants, we also saw considerable, I guess the economists call it economy of scale of setting up a practice where you put the system in and then to add on more doctors into that system really wasn't that costly. So this is one area where size makes a lot of difference in the cost per physician to get them into the system. So kind of putting a

benchmark on that somehow I think would help us in that need area.

The last thing I want to get to is what Carol said. What's more frustrating than anything is to get a call from a home health agency or from the nursing home where we're trying to provide what we've been talking about all afternoon about chronic care management and all of that, nursing home charts at the nursing home and they're trying to tell me what medicines they're on. I really think this is a great chance for MedPAC to say that the end goal here is that we're going to bring together all providers. If we're really ever going to manage this chronic care or chronic disease thing we're going to have to have access to not just the hospitals and the doctors offices.

But anyway, great chapter. I thought it was good.

DR. NEWHOUSE: That's a good follow-on to me. First of all, I'm very glad we took this topic on. I think it's very important.

I've been engaged in a small project with some others on doing what we called an IT biopsy of Boston and Denver. We picked those two markets because we didn't have much money to do any more and because we thought Boston was kind of in the vanguard and Denver was probably a fairly typical large market in this regard.

What we found is what goes along with what Carol and Ray are saying. So we looked at the extent of IT diffusion across various sites, and not surprisingly it was actually greatest for pharmacies, and hospitals trailed along and by the time you got to M.D. offices and nursing homes and SNFs and home health agencies and dentist's offices and ASCs it went down to very small numbers. I think we'll be probably coming out with that fairly soon.

The other thing I wanted to say, maybe I should take off my academic hat or turn in my union card, but I'm concerned about the role for federal research here. My concern is actually under the procurement laws, or alternatively, peer-reviewed grant mechanisms, the time delays are long and by the time money gets out the door and the research is done, technology has probably changed. And there is fairly strong incentives, obviously, for the vendors to try to demonstrate value when they're trying to market their products.

So I'm a little skeptical of, beyond what the feds are doing now, which I think is very good, how much more they should be doing of the kinds of things that we say at one point in the draft -- I was looking at where we refer to catalogs of products and research on value and so forth. I thought there was some reason to be skeptical.

DR. WOLTER: I just wanted to add on to Carol's comment about the efficiency side. I think that it is hard

and complex, but Mary and I heard Brent James 10 days or so ago at a rural health workshop she's chairing, talk about InterMountain Healthcare's goals, and they have a specific target of 10 percent efficiency improvement related to their IT installation, and they think that's conservative. They've done a lot of work in this area. Mayo, Jacksonville and Geisinger have also done some analytic work on how they look at the efficiency returns from their investment.

MR. HACKBARTH: Nick, could I just ask you about those targets? That's for what kind of IT?

DR. WOLTER: Clinical.

MR. HACKBARTH: Including medical records?

DR. WOLTER: Yes, electronic medical record, alerts, medication error improvement, et cetera.

Then also on the grant and loan and finding ways to fund, I'm wondering if it would be worth linking our conversation about that to quality outcomes. And if there were to be federal funding of some kind, whether it's targeted or however it was developed, would it be worth suggesting that that funding be targeted not just to the installation of the systems but to some kind of reporting of outcomes or some value that can be demonstrated? Is that something we should be discussing?

MR. MULLER: Let me also add my compliments to you on the chapter. One of the themes you stressed is the one you learned how to pronounce on interoperability. One of the questions I have is how important this is going to be. Obviously at one level one thinks one should have, especially with electronic communication, the ability to share information across all sites. Joe just referenced how some areas like hospitals and pharmacies are further along than SNFs and other settings. But we also know that inside even places like hospitals, bringing together various systems such as radiology, labs, physician offices and so forth is very difficult because by and large you get a lot of robustness in each one of those applications and it's very hard to get people to say, I'll water down the robustness to the lowest common denominator so they can communicate to each other.

Now obviously that problem of how to share information in medical practice has been with us for many years before computers and hopefully computers make it more easy to share that information. But that being said, it's still difficult at times for these systems to speak to each other. So one of the questions that I have therefore is, are there advances going on in the way it happened in web-based technology and broadband in recent years that may make the interoperability possibilities greater? And is that likely to occur? Because I really don't see there being common -- I don't see there being systems that speak to each

other that easily in terms of common denominators as we know right now. Gastroenterologists use different categories, and cardiologists use different categories, and radiologists. You can go on and on; a hundred examples like that, 1,000 examples like that.

So how does one really get the information that we want on the patient populations going back -- whether it's questions over time like our previous conversations about chronic disease management, questions across different providers going from Grand Forks to Fargo and so forth, just one part of town to another between a pharmacy and a hospital, nursing home and so forth?

So if you could be thinking a little bit along the lines of, are there advances coming forth in the broader world of technology that makes a more possible for interoperability to move forward? Because I think it's unlikely that it will happen inside the systems themselves, for the reasons I mentioned, because you always want the power of the specific application, whether you're an insurer or a hospital or a physician or a pharmacy or whatever. So I don't see us developing one set of systems that can do all these things.

So the question is, as we keep developing these hundreds of systems in these various areas, are there ways of bringing the information together in those various setting?

DR. WAKEFIELD: Just a couple of comments. I would reinforce Ralph's comment, or at least his last one, and that is, to the extent you can help inform us a bit about the interface across different systems and the work that's underway there to try to allow for linkages in a more porous exchange I think that would be helpful. Clearly there has been and there is effort underway there. But I guess now that he's mentioned it, I didn't really see that reflected in the chapter and I think that would be a good add.

I want to come back in on Carol's comment and just say that IT is for so much more than just physicians. It's for pharmacists, nurses, dietitians, the whole range of health care providers, and that's absent I think in the chapter. There's a nod here or there to nurses, for example, but pharmacists are just critical when we think about CPOE. Frankly, even patients. We can start to be thinking about how consumers get dealt in in terms of information sharing. So I would try and cast that part of the content a little bit more along those lines. Carol mentioned the different settings and now I'm mentioning the different disciplines in the team including the patient. So a little bit of that focus I think might be good.

The second is I liked your notion, I'm not sure it

needs to be expanded but I certainly want to reinforce it, and that is what accrues financially with an investment in IT to a local facility versus what doesn't? So how do we incent through payment policy IT application. What I know from personal experience right now is my 86-year-old mother, Medicare beneficiary, who twice now has had wrong-sided procedures, one of them that absolutely would have been prevented had there been an electronic medical record available. But instead it was regrettably a physician who had to rely on memory and information that was located about two floors up and some distance away and not readily accessible.

Who paid there? Medicare did. Medicare paid for two procedures. And she paid because she had to go through two procedures. And I paid because I had to take two afternoons off, for example. So it's a little bit that notion of why is it that some facilities may not be stepping up to the plate, or making sure that we're capturing who is paying, because in some instances I think it's probably pretty clear there is a cost, and Medicare on occasion, at least from my experience, does pay. So you make that point a bit. I just would want to make sure it doesn't get lost or maybe it could be even made a little bit more strongly.

The last point I think I had is that a lot of this is about the hardware and the software. You mentioned changes in work processes and there's a lot of discussion, for example, about physician resistance primarily and then I think maybe a second tier of nurse resistance or somebody else. I think that's really important, how we get the buy-in, and how that might be serving as a barrier.

But in addition, I'd say if we could capture a little bit more, especially when we're speaking to the federal government -- and I don't know how you operationalize this, but it's not just the technology. It is ensuring that whatever Medicare might be paying for, that we're paying attention to the expectation that not only is that hardware put in place but that practice patterns around it change too. It's the culture of the organization, and embedding it within a system of care.

That sounds a little bit trite but I'll give you a concrete example. On page five where you're talking about automated dispensing machines that distribute medication doses and they remove the possibility of pharmacist or nurse error. At least in one case that I know of it actually introduced new error because the automated dispensing machine dispense the wrong drug. Had the nurse who picked it up there not looked carefully and -- so in other words, she was still paying attention to the five rights: right does, right patient, right everything else, and checked the drug. But had she not and had she relied on that solely

there would have been an error introduced by that technology that wouldn't have occurred before.

So that is just an example. It is all about the hardware and software, but it's very much too about what's going on -- wrapped around those systems. The AHRQ IT initiatives that are being funded right now, I was part of at least the rural development of some of those parameters, and I'd say now in retrospect we might have paid a little bit too much attention to the IT and what we're trying to drive on that side and maybe not quite enough to what else does the system have to do or the health care infrastructure have to do to make sure that that application doesn't introduce more compromises in patient safety and so on.

So I don't know how you speak to that but it just struck me so much of this was focused on resistance to the application and a few times mentioned change in work processes, but I think it's more than that.

The only other point I wanted to make is I think I saw passing reference here or someplace else to the role of QIOs, or maybe I saw this someplace else. I'd just say maybe we could think about whether or not there's a lever to pull there to in terms of quality improvement organizations working with health care systems and facilities. They work with hospitals and clinic and nursing homes and so on now. Maybe this could also be a piece of their portfolio in some fashion. I don't know, but I certainly know the reliance on QIOs, at least in our rural facilities. It's an area of expertise that gets brought out to rural areas that they just don't otherwise have access to.

So that's a vehicle for distributing information on quality assurance and quality improvement that maybe the big facilities don't need as much. But it's an entry for our smaller facilities at least and maybe there's a role there in terms of IT application.

MR. DeBUSK: Mary, I believe those that you're talking about, perhaps for the drugs bar coding will correct all that. Bar coding will take care of that.

We seem to be running around in circles here. Isn't there someone out there in the field, some hospital or for-profit or someone who's got a pretty comprehensive computer system put together to address a lot of the clinical issues?

DR. MILLER: As part of this effort we are talking to people in the field who are doing this, and I myself have gone out and talked to at least a couple of plans that are doing these kinds of things.

MR. DeBUSK: A couple of plans? I believe this is an area where if we really got on it and did some field visits and contacted some people across the country probably we could find a lot of answers to this, because we're just

grabbing for pieces in here now and probably there's some real information out there if we'll just go pursue it.

MR. HACKBARTH: There certainly are organizations that have invested a lot of money and a lot of time in this. But even at those organizations you don't necessarily have answers to all these questions. Some of the things are just very difficult to measure, very difficult to assess. So it's not quite as simple as just going to the right people.

MR. DeBUSK: I understand that. A lot of the areas that I think we come right back to is addressing protocols, really addressing protocols and established standardization in protocols and approaching it a bite at a time, with different applications, taking protocols and eating into the clinical aspect.

Now let me ask you something else. By law, how much of these records do we still have to have a paper copy of that we've got to store in a warehouse and keep for 15 or 20 years?

MR. HACKBARTH: I don't know the specific rules, but once you go to a computerized system it's not like you need to keep paper records, paper copies of everything.

MR. DeBUSK: I think you still have to under some law.

MR. HACKBARTH: Are you talking about the old record?

MR. DeBUSK: Yes.

MR. HACKBARTH: Typically what you do I think, at least what we did at Harvard Vanguard in Boston is that you backload the data. You just don't start on day one and collect only data going forward. You take the old data and put it into the system. Now I don't know what the conventional practice is for people who are converting from paper records to -- Ralph, you're saying no?

MR. MULLER: Given the under-investment, if you really want to see under-investment, take your back records -- I mean, that will kill the -- I mean, I think you can do it here on some simple stuff, but by and large most people do not, your phrase, backload the data. What they do is they do it going forward.

MR. HACKBARTH: Our situation was unique because we were converting from one computerized system to another which obviously makes that task a lot easier.

Can I just leap into the queue for a second? I think there's a lot of really excellent stuff. It's very thoughtful, very careful look at the issue overall. There was a strong emphasis and I think an accurate emphasis that often the gains are difficult to quantify, and that's an impediment in some cases to people making a very substantial investment in doing this.

But I think equally important is that often the

gains accrue to others. There are real externalities here. I think one of the reasons that you see organizations like my old organization, Harvard Vanguard or Kaiser Permanente doing this is that they're fully capitated, so they're at risk for the whole range of services. And if by changing practice over here you can save money over there, the gains accrue within the same system.

Whereas, in the more fragmented fee-for-service system, often the gains will accrue to other people. So I'm worried about those externalities. I think I'm using the word correctly, Joe -- and that that means that the market, left to its own devices, may not solve this problem. That leads me to think that maybe we do need to think about ways that the public sector can help support the development and dissemination of these systems.

DR. REISCHAUER: On that very point. You're right about Kaiser Permanente sort of, but people leave the system, so they don't capture it. One thing that Medicare has to its advantage is, when you leave the system you've left for good and you are joining someone else's system, or at least one with high medical costs.

MR. HACKBARTH: That would be fine though if Medicare were the one making the investment. But Medicare isn't.

DR. REISCHAUER: No, I'm getting to the point which is, the argument is, therefore Medicare should be willing to pony up some of this because eventually it will reflect back in lower fees -- could, maybe.

MS. RAPHAEL: But I think in line with that, that's something that I've been thinking about, because with the externalities you can't really measure the return very precisely. I think it was Jeff Goldsmith who told us, only 40 percent of IT projects succeed.

So given all of those things I agree, how will we see that this really progresses? And the high cost. The costs are really incredibly high. I envy the IT companies. I wish I had that kind of product where you buy the product and they immediately tell you that you have the wrong product, that they can't support, and you have to upgrade it at the cost of \$1 million.

MR. MULLER: That's why people don't buy it, Carol.

MR. HACKBARTH: Somebody earlier asked about the scale of the investment. For Harvard Vanguard, a group with 500 to 600 physicians, when you count everything, software, infrastructure, training, you are talking tens of millions. My recollection is something on the magnitude of a \$40 or \$50 million investment. Alan may know how much InterMountain Healthcare has spent on this. It's big bucks.

DR. WORZALA: I didn't put it in the presentation

but you probably heard me before pulling through papers to get some of these numbers for you on the average cost. I'll just run through a few of them. It totally depends on the institution and the installation and what you're doing, and training and all those things. These are some average costs coming out of the lit review. For the bar coding, \$350,000 to \$1 million; for PACS, \$3 million to \$4 million. It can be much more than that if it's a larger institution. CPOE, a range of \$3 million to \$20 million. And then again, electronic health records, really tens of millions. That's a big-ticket item.

Then the physician EHR is a little bit less expensive but I think in terms of revenue it's the same large investment. They're talking about \$25,000 per physician, but again there's a marginal decline in the cost for additional physicians in a given practice.

I just wanted to say one thing, as part of this work, part of what we built on here was a series of interviews that a contractor did for us with 12 hospitals that are very advanced in their use of IT, and eight hospitals that are less advanced in their use of IT. I can't give you the names of the institutions because we did promise them that they wouldn't be identified, but these are some of the big leaders in IT. They all had a different story, but some of the main threads that I pulled out of here were derived from talking with the leaders in use of IT as well as people who aren't as far along.

One of the observations really does coincide with what you were saying, Glenn, many of these leaders in use of IT are more closed systems, or hospitals that employ their physicians where there's much more internal -- the externalities are internalized because of the size of the organization and the breadth.

MR. HACKBARTH: Even when it turns out to be a success story, it's lots of painful moments on the road to success. It's just not easy stuff to do.

MR. FEEZOR: Just quickly, Glenn. You touched on exactly what I hoped that we would emphasize, and that is because the investments are disproportionate probably to the returns that I would hope our report would you, as you suggested, explore a bit more either what the actual legal interpretations are in terms of different providers investing for other provider's benefits, or your safe harbor I think is how you mentioned it, or other community ways of funding that.

Second, I would just underscore Carol and Mary's point that IT not just as transfer of information but as decision support, not just for the clinician but I think increasingly for the patient or the would-be patient.

Third is, just ought to emphasize Jack's concern

that the costs are so formidable that our small and our not-for-profit institutions may not be able to do that, and I think some greater emphasis on the range of investment and what that would mean in terms of the smaller institutions, total budget might be helpful.

Then finally, Glenn, I think getting back to what I think I heard you alluding to, I think this is so important to so many aspects of other issues that we have been focusing on and that Congress has been -- I hope that we would take a leadership position, or at least be urging both the Congress and the administration to really focus and try to accelerate the evolution of policy in this area so that there could be both consolidation and stability within the market by which these technologies could be more broadly applied.

DR. REISCHAUER: I was wondering whether there is another country or a Canadian province which is far advanced from where we are which we might use as a description of the potential --

MR. MULLER: The U.K..

DR. REISCHAUER: That's what I was thinking of a weekend trip for you two.

MR. MULLER: The U.K. has done more and they're basically implementing a lot of the work that comes out of Berwick's group who are doing a lot of the design. So obviously, as a system that's more closed they can make these kind of investments and follow it. It's also fair to say that the investment even there is modest compared to what the potential investments can be.

DR. NELSON: I think it's important to at least reference the potential for the future to be less expensive, less costly as we move to a secured open source electronic health record that's web-based, that doesn't rely on software that people have to buy, and that allows the patients to enter information into the electronic health record and have access to the information in there. So that if they're monitoring their blood pressure or their blood sugar or whatever, they own part of that record and they can enter information into it. I think the field is moving so quickly in this area that software is not going to be a problem in the future.

DR. MILLER: Just to make a couple points. You two are not going to the U.K., so just make sure we put a stop to that right here. But actually as we were thinking through this there's a couple of points. To Mary's point, whether it came through or not, we spent a lot of time talking about the process, and that you can purchase the software but the notion of getting people to use it and working through it and those things was something that we spent a lot of time talking about. We'll make sure that

that comes out.

But because of that, because of the uncertainty of the ROI -- we all agree that this is an important infrastructure, but if we go down the road of thinking about federal incentives we ought to think carefully about those. And because it's so uncertain we might want to think of incentives that have a shared risk to them so that it's not just a one-sided proposition for the federal government.

MR. MULLER: I would say in terms of, the software may be inexpensive, but that's not where the big costs are in system installations. In fact I think for the last year or two, the VA, which has quite a sophisticated system, has made it available to anybody to adopt for free, and as far as I know nobody has yet adopted it, in part because it doesn't connect to the other systems that they have and a lot of the cost, as all of us know, really are in training staff, changing other kinds of systems, people systems, management and so forth. So I don't think we should understate by any means how expensive these installations are.

In some ways, the software may be the cheapest part of this and it's all the other costs that make it so dramatic. It's really changing how people practice. And those costs are interlaced and marbled throughout the whole health system. So I think it's important to both have -- I share Glenn's sense that having some vehicle for having Medicare support these kind of investments I think is important. At the same time I do think we should not understate how expensive it is to make these kind of improvements, largely because they're not just cost of software. They're costs of how one runs health systems.

MS. MILGATE: Could I just make a comment on that? When we talked to different systems about that, in fact when we talked to the VA and I asked them about VISTA, this isn't a software that others could use fairly cheaply and he said, that's not the point really. The point is everything else Ralph said.

But when we talked to the systems about that, to them they didn't think of that -- I mean, they included it as costs but they said, the real situation is the commitment to doing that, the leadership to doing that, the time it takes to do that. So they weren't as concerned about the dollars. They were more concerned about whether their organization had the capacity to actually make that type of change.

DR. NELSON: I think it's different if we're talking about a big health system than if we're talking about a two-person physician group. The new generation of physicians are going to demand it, and it's going to be linked to decision-support systems that help them, as well

as managing the rest of their practice. In that sense, finding things like an open source electronic health record that is secured as an alternative to what's happening. That's a very practical approach.

MR. HACKBARTH: Okay, thank you.